Short Communication

Even the stars think that I am superior: Personality, intelligence and belief in astrology

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A R T I C L E   I N F O

A B S T R A C T

Belief in astrology is on the rise, although the reasons behind this are unclear. We tested whether individual personality traits could predict such epistemically unfounded beliefs. Data was collected for 264 participants through an anonymous online survey shared on social media. The survey consisted of four instruments: Belief in Astrology (BAI), the Big Five personality traits (IPIP-30), narcissism (SD3) and intelligence (ICAR16-R3D). Data analysis was done with multiple linear regression. Narcissism was surprisingly the strongest predictor, and intelligence showed a negative relationship with belief in astrology. Overall, our novel results suggest that something as innocent as astrology could both attract and possibly reinforce individual differences.

1. Introduction

Astrology is increasing in popularity (Pew Research Center, 2018), despite the lack of scientific support (Allum, 2011). It is not clear why this ancient practice of studying positions and movements of celestial bodies, with the conviction that they influence human behaviour, is going through a revival. However, previous literature suggests that when societies or individuals are under stress or threat, people are more likely to turn to astrology and other epistemically unfounded beliefs (Grech, 2017; Keinan, 1994). Previous research further shows a relationship between personal life crises and belief in astrology (Lillqvist & Lindeman, 1998). Currently we are surrounded by stressors such as climate change and, recently, the Covid-19 pandemic, which makes the topic pertinent. Though embracing astrology might seem innocent, it is nonetheless possible that it facilitates uncritical thinking and favours biases. Further, belief in astrology correlates with belief in multiple other pseudosciences as well as with belief in conspiracy theories (Bensley et al., 2020) which indicates that it might not be all that harmless.

The present study set out to explore individual differences regarding belief in astrology. Although there is no consensus concerning what makes some people more susceptible to pseudoscientific beliefs than others, commonly mentioned factors are personality traits and cognitive biases (Bensley et al., 2020; Bouvet & Bonnefon, 2015; Pennycook et al., 2015).

1.1. Big Five, narcissism, intelligence

The most accepted theory regarding individual differences is the five factors of personality traits (also known as Big Five); openness, conscientiousness, extraversion, agreeableness, and neuroticism (Costa & McCrae, 1992). Openness is usually positively associated with belief in the paranormal (Chauvin & Mullet, 2021), as well as apophenia (Blain et al., 2020). Conscientiousness may be the personality trait with the least connection to pseudoscientific beliefs, and weak negative correlations have been reported (Chauvin & Mullet, 2021). Extraversion too has been shown to be related to belief in the paranormal (Thalbourne & Haraldsson, 1980), whereas agreeableness in earlier studies has correlated both positively (Čavojová et al., 2020) and negatively (Swami et al., 2009) with belief in conspiracy theories. At last, neuroticism has been found to correlate positively with paranormal beliefs (Thalbourne & Haraldsson, 1980).

Though the dimensions of the Big Five are valuable when studying individual differences, there are additional so-called dark traits (cf. Kajonius et al., 2015). One dark trait in particular seems relevant in relation to belief in astrology, namely narcissism, due to the self-focused perspective that may be at the core of both phenomena.

In addition to personality traits, intelligence is commonly used in studies of individual differences. Particularly openness has proved to correlate with intelligence measures (DeYoung et al., 2014). In general, intelligence is thought to be negatively related to the acceptance of pseudoscience and paranormal beliefs (Musch & Ehrenberg, 2002), as

well as with apophenia (Blain et al., 2020).

1.2. Present study

The present study aimed to investigate whether personality traits and intelligence can predict belief in astrology. To the best of our knowledge, no earlier studies have been conducted on narcissism and intelligence regarding belief in astrology.

2. Method

2.1. Participants and procedure

The number of participants who completed the anonymous questionnaire was $N = 264$. Most participants were women (87%) in the age-span of 25–34. The questionnaire was created in Qualtrics, and participants were recruited via word-of-mouth on Facebook. The survey was done in English and was conducted in line with the ethical guidelines provided by the Swedish Ethical Review Authority and with the 1964 Helsinki Declaration (and its later amendments).

2.2. Materials

2.2.1. The Belief in Astrology Inventory (BAI)

To assess belief in astrology, we used the Belief in Astrology Inventory created by Chico and Lorenzo-Seva (2006). The original 24 item scale is unidimensional and has been found to have high internal consistency (Chico & Lorenzo-Seva, 2006). However, we selected only eight items to form a short scale. The selection was based on non-redundant items and content deemed relevant. Internal reliability was very high for this shortened scale, $\alpha = 0.90$. Statements were assessed using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

We also included an item asking how well the participants thought astrology is supported by scientific research (1 = not at all well supported; 5 = extremely well supported). This was used as a one-item variable called "Scientific Support".

2.2.2. The IPIP-30 Personality Scale

To measure Big Five personality, we used the IPIP-30 personality scale. These 30 items were derived from the original IPIP-NEO-120 (see Kajonius & Johnson, 2019). Each of the five personality factors was measured as the average composite of six items on a Likert scale (1 = strongly disagree; 5 = strongly agree). In five different studies using short versions of the IPIP with various items, Cronbach's alphas were consistently at or above 0.60 (Donnellan et al., 2006). In the present study, Cronbach's alphas were overall very good (Conscientiousness 0.78, Extraversion 0.81, Agreeableness 0.70 and Neuroticism 0.86), with the exception for Openness 0.54.

2.2.3. Short Dark Triad of Personality (SD3-Narcissism)

We used the nine items measuring grandiose narcissism in the Short Dark Triad (SD3) to assess narcissistic traits, $\alpha = 0.72$. SD3 is a widely used scale and has shown good validity and reliability (e.g., Persson et al., 2019). Participants answered the items on a Likert scale (1 = strongly disagree; 5 = strongly agree) where higher scores indicate higher levels of grandiose narcissism.

2.2.4. Intelligence

To assess intelligence, we administered three-dimensional rotation items (R3D) from the International Cognitive Ability Resource (ICAR) (Condon & Revelle, 2014). This consisted of four items with eight possible answers for each item, though only one is correct. We averaged participants total scores with the number of items so that maximum was 1 and minimum 0. Cronbach's alpha was 0.76. Visual-spatial reasoning has a strong correlation with other measures of intelligence, for example Wechsler's Adult Intelligence Scale (Condon & Revelle, 2014). We also

collected information regarding age and legal gender.

2.3. Analysis

We performed descriptive analysis using SPSS Statistics v. 27. Participants missing more than 50% of the scores were excluded from the analysis. Little's MCAR test showed that values were missing completely at random ($\chi2 = 348.665$, $df = 346$, $p = .450$) for the study sample. Missing values were imputed using Expectation-Maximization (EM).

To answer the research aim, which individual differences predict belief in astrology, we conducted zero-order correlations as well as a multiple regression analysis. All Big Five traits (IPIP-30) and Narcissism (SD3) as well as intelligence (ICAR-R3D), gender, age and "Scientific Support" were added as predictors, with belief in astrology (BAI) as the outcome variable. There were no violations of the assumptions of normality, linearity, homoscedasticity, or multicollinearity reported. Interpretation of effect sizes were based on the guidelines by Gignac and Szodorai (2016).

3. Results

For descriptive statistics, see Table 1. We first conducted zero-order correlations between all measured variables (Table 1). Belief in Astrology and belief in Scientific Support correlated clearly. Among the individual personality traits, Openness and Agreeableness, as well as Narcissism, showed small positive correlations with Belief in Astrology, while intelligence showed a negative relationship.

To further establish the study aim, a regression model was tested. Demographics (gender and age), intelligence, and personality (Big Five, Narcissism), as well as belief in Scientific Support was entered simultaneously into the model. The model as shown in Table 2 explained 23% of the variance in belief in astrology, $F(9, 254) = 9.56$, $p < .001$, adj. $R^2 = 0.23$. Being female and older showed some small effects on Beliefs in Astrology. When controlling for all variables, narcissism was the strongest predictor for Belief in Astrology ($\beta = 0.29$). Openness, Conscientiousness, and Neuroticism showed no effects, while Agreeableness and Extraversion showed small effects. Intelligence had a small significant negative effect, even after controlling for all variables.

4. Discussion

The present study aim was to investigate how individual differences relate to belief in astrology. The main result showed that the higher the narcissism, perhaps surprisingly, the higher the belief in astrology. The positive association is possibly due to the self-centred worldview uniting them, though this must be examined in further research. Furthermore, cultural aspects of millennials may emphasize the uniqueness of individuals which might lead to a more egocentric view of the world, and thus relate to narcissistic traits. Further, since astrological predictions and horoscopes tend to be positively framed, this reinforces grandiose feelings and thus might appeal even more to narcissists. Note that narcissistic traits correlated with the belief that astrology is supported by science (Table 1), which leads to a speculation that narcissists may generally be more fact resistant.

Other interesting findings was that the higher the level of intelligence, the lower the belief in astrology (see Musch & Ehrenberg, 2002), as well as that agreeable people tend to report believing in astrology more. Seeing how most personality predictors were small in magnitude, this leaves room for many other variables influencing belief in astrology. Speculatively, additional predictors could be cohort-effects, educational levels, occupations, and others.

4.1. Limitations

As with most survey designs, social desirability bias, common method bias, and the use of self-report may be an issue. Another

Table 1

Correlations between study variables.

	M	*SD*	1	2	3	4	5	6	7	8	9
1. Belief in Astrology	3.27	1.03									
2. Openness	4.07	0.53	0.12*								
3. Conscientiousness	3.65	0.63	−0.04	0.02							
4. Extraversion	3.50	0.73	−0.03	0.11	0.33**						
5. Agreeableness	4.00	0.60	0.13*	0.31**	0.17**	0.11					
6. Neuroticism	2.72	0.82	0.09	0.06	−0.42**	−0.40**	0.18**				
7. Narcissism	3.06	0.65	0.19**	−0.14*	0.19**	0.44**	−0.18**	−0.21**			
8. Intelligence	0.28	0.34	−0.16*	0.06	−0.14*	−0.12*	−0.02	0.01	−0.13*		
9. Scientific support	1.81	1.02	0.35**	−0.04	0.02	0.07	0.02	−0.04	0.17**	−0.14*	

Note. *N* = 264. Belief in Astrology = BAI. Big Five = IPIP-30. Narcissism = SD3-Narcissism. Intelligence = ICAR-R3D. Scientific Support = "How well supported is astrology by scientific research?"

* *p* < .01.

** *p* < .001.

Table 2

Belief in Astrology regressed on Big Five, Narcissism, Intelligence, Gender, Age and Scientific Support.

	b	β	*p*-Value
Openness	0.11	0.06	.389
Conscientiousness	−0.14	−0.09	.202
Extraversion	−0.24	**−0.17**	.022
Agreeableness	−0.32	**0.19**	.007
Neuroticism	0.02	0.02	.818
Narcissism	0.46	**0.29**	<.001
Intelligence	−0.45	**−0.15**	.014
Gender	−0.37	**−0.18**	.001
Age	0.19	**0.18**	.003
Scientific Support	0.28	**0.28**	<.001

Note. *N* = 264. Bold standardized estimates indicate significance. Gender (1 = female, 2 = male).

limitation was that we had no control over who participated in the study, thus introducing a potential selection bias. In the same vein, we do not know how much participants know about astrology. Also, since the vast majority were younger women recruited through social media the sample is not generalisable to a broader population. Another possible concern in the present study is the use of short versions of the scales, especially Openness which showed a low internal consistency and did not show expected effects in the regression model. One indication of this is that openness and intelligence did not correlate significantly in the present study (see Table 1). Lastly, most of the reported effects were acknowledgeable small (Gignac & Szodorai, 2016), which leaves room for both type I-errors as well as for the influence of other variables, outside individual differences.

5. Conclusion

Our aim with the present study was to contribute to an increased understanding of individual differences and unfounded epistemic beliefs, such as belief in astrology. The results showed interestingly that narcissism was the strongest predictor of belief in astrology: Even the stars think I am superior.

CRediT authorship contribution statement

Ida Andersson: Writing – original draft, review and editing, methodology, statistical analysis
Julia Persson: Writing – original draft, review and editing, methodology, statistical analysis
Petri Kajonius: Review and editing.

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